

Protected Areas Database of the United States



*Presentation for the
National Geospatial Advisory Committee
June 30, 2021*

Roadmap

- Topics
 - PAD-US overview
 - Current applications
 - 30x30 and climate opportunities
- Q&A



Core Science Systems

Science Synthesis, Analysis and Research Program

➤ Underpins USGS Science

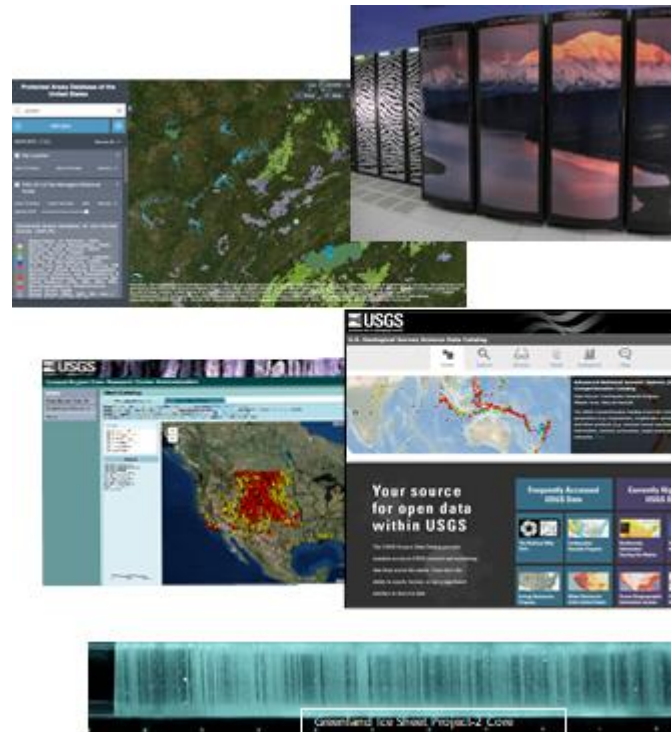
- Nationally-consistent, foundational geological, geophysical and biodiversity data used in landscape scale conservation, risk assessment, and resource management decision-making
- Advanced Research Computing - high performance computing and training
- Science Data Management - tools, expertise, best practices

➤ Accelerates research and decision making

- Analytical tools, maps, and data synthesis provide decision makers with actionable intelligence
- John Wesley Powell Center for Analysis and Synthesis

➤ Provides long-term preservation of scientific data and collections

- USGS Library, ScienceBase, Geological Materials Repository

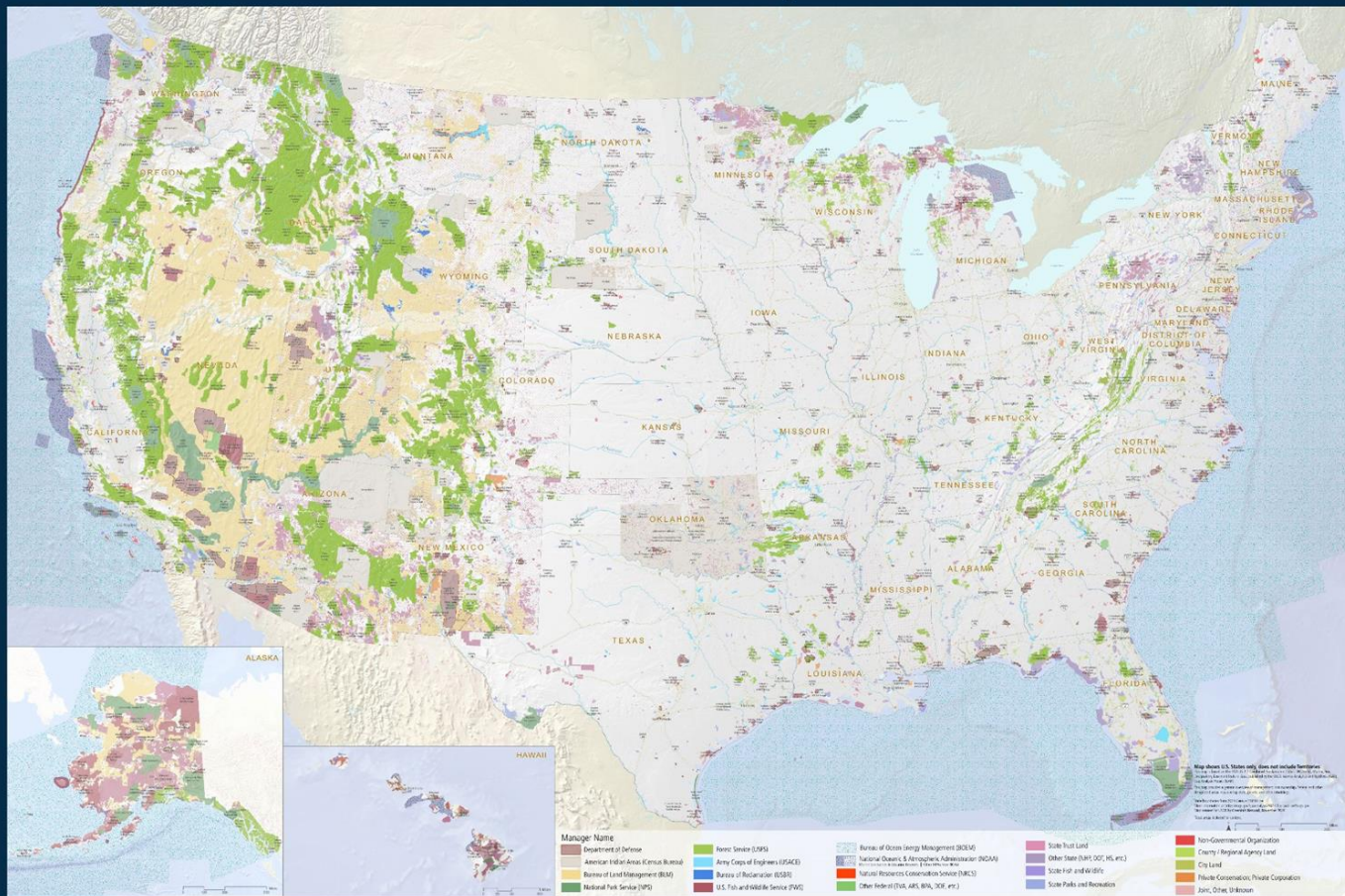


What **is** PAD-US?

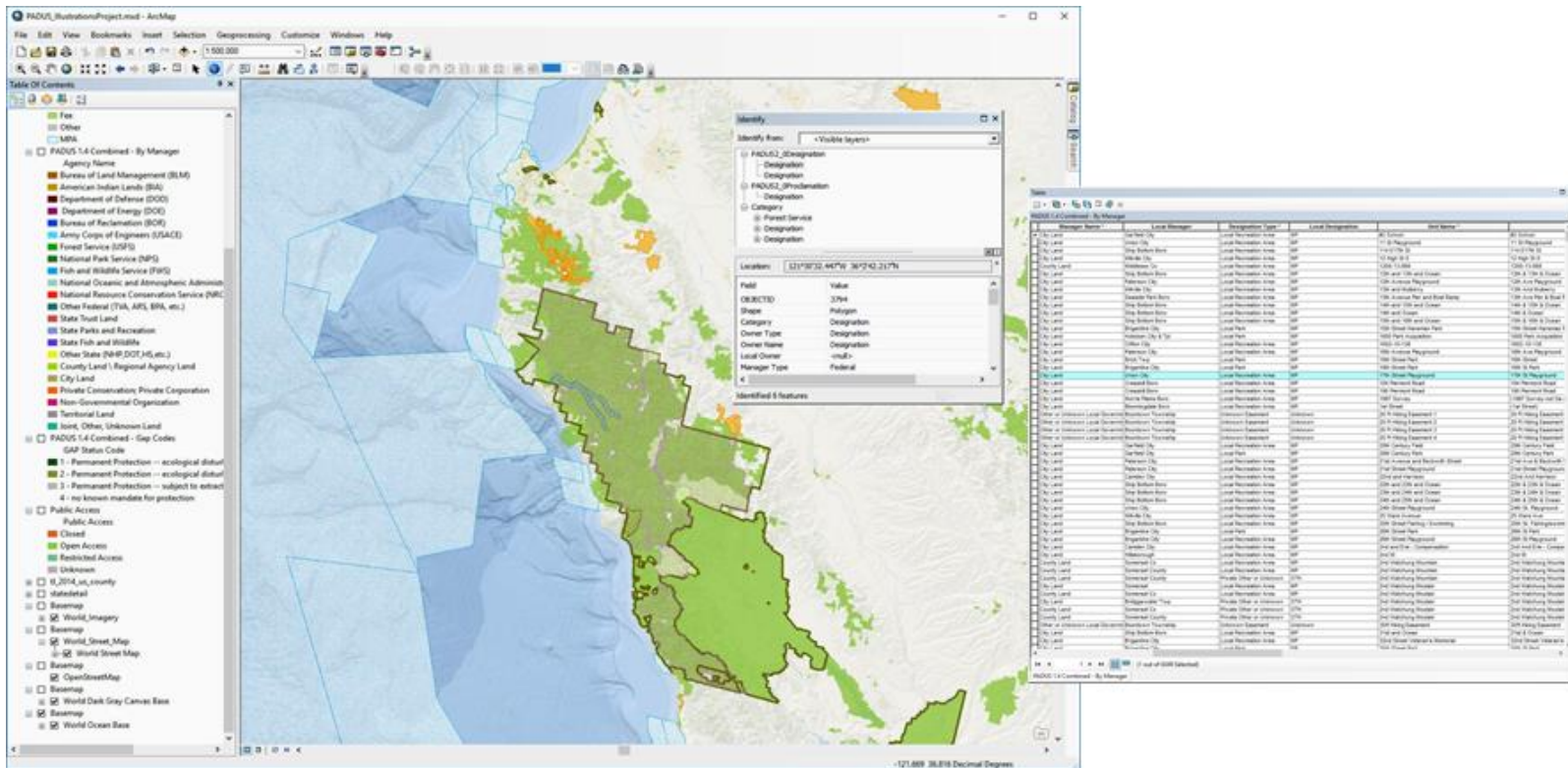
What is PAD-US?



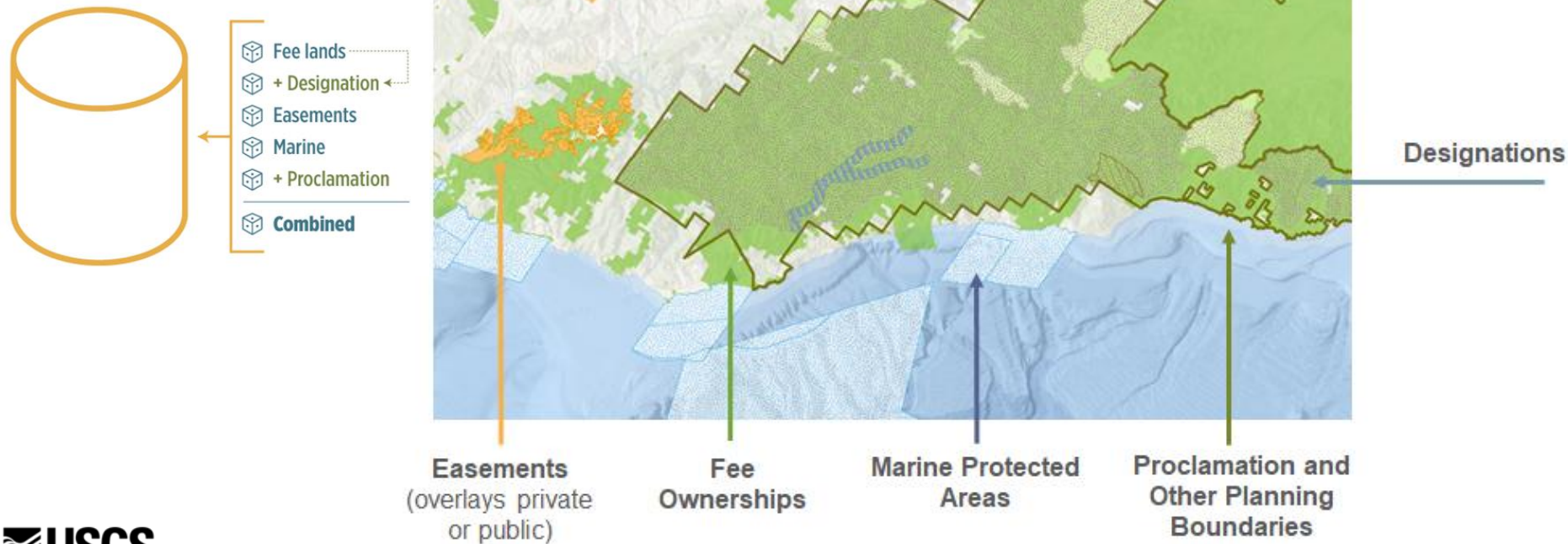
Protected Areas Database of the U.S. (PAD-US) - All Managers



PAD-US is geospatial (GIS) data



Many data elements






Many users and uses

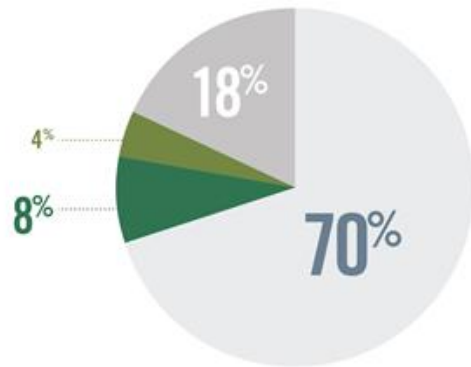


- ✓ Recreation planning
- ✓ Wildfire management
- ✓ Energy facility siting
- ✓ Biodiversity conservation
- ✓ Public health
- ✓ Emergency management
- ✓ Land use planning
- ✓ And more . . .

National Geospatial Data Assets (NGDA)

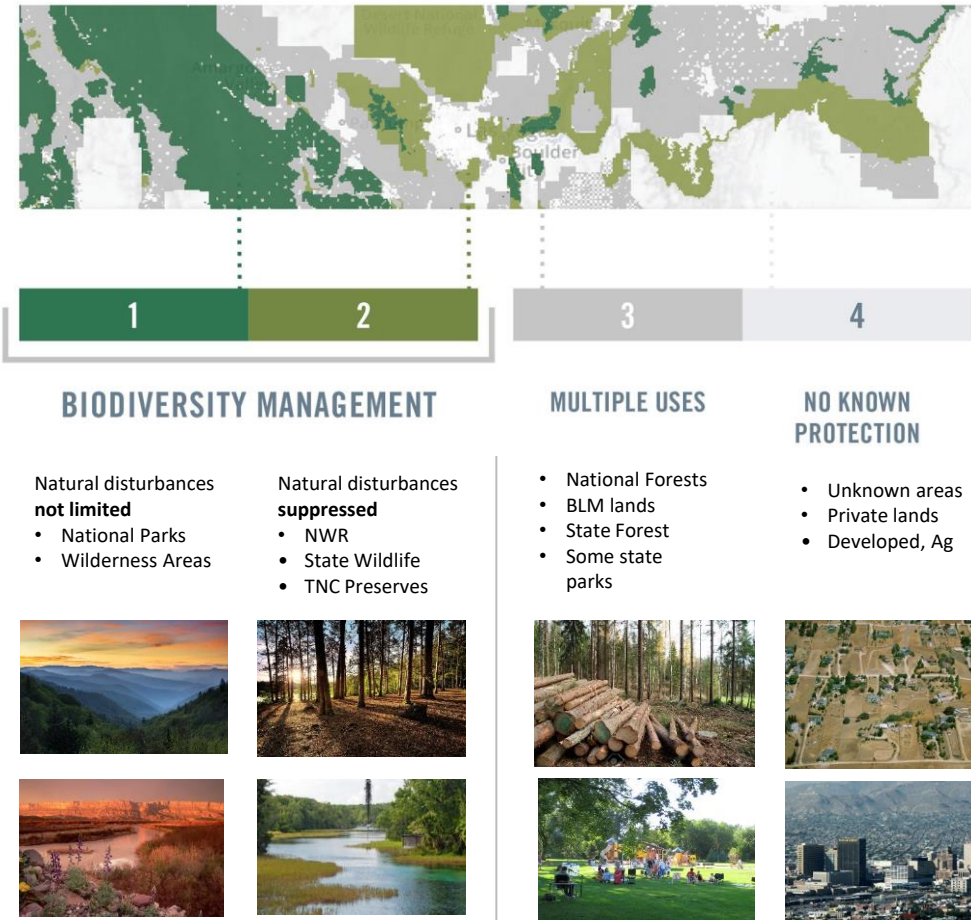
NGDAID ▲	Status ▲	Theme Community ▲	NGDA - Links to Data-gov Metadata ▲	NGDA - GeoPlatform- gov Dataset Resource Pages ▲	Dept- Agency Abbrevi... ▲	Department-Agency ▲
	 ...	 Theme Com...	NGDA - Links to Data-gov Metadata	NGDA - G...	 ...	Department-Agency
1	Approved	Biodiversity and Ecosystems	Bailey's Ecoregions and Subregions Dataset	Data Resources	USDA-USFS	U.S. Department of Agriculture, U.S. Forest Service
2	Approved	Biodiversity and Ecosystems	Environmental Sensitivity Index (ESI) Data Viewer and REST Services for Atlases	Data Resources	DOC-NOAA	Department of Commerce, National Oceanic and Atmospheric Administration
3	Approved	Biodiversity and Ecosystems	FWS Critical Habitat for Threatened and Endangered Species Dataset	Data Resources	DOI-FWS	Department of the Interior, U.S. Fish and Wildlife Service
4	Approved	Biodiversity and Ecosystems	Terrestrial Ecosystems of the Conterminous United States	Data Resources	DOI-USGS	Department of the Interior, U.S. Geological Survey
5	Approved	Biodiversity and Ecosystems	U.S. Geological Survey - Gap Analysis Project Species Habitat Maps CONUS_2001	Data Resources	DOI-USGS	Department of the Interior, U.S. Geological Survey
6	Approved	Biodiversity and Ecosystems	U.S. Geological Survey - Gap Analysis Project Species Range Maps CONUS_2001	Data Resources	DOI-USGS	Department of the Interior, U.S. Geological Survey
7	Approved	Biodiversity and Ecosystems	Omernik's Level III Ecoregions Of The Conterminous United States	Data Resources	USEPA	Environmental Protection Agency,
197	Pending Approval	Biodiversity and Ecosystems	GAP/LANDFIRE National Terrestrial Ecosystems	Data Resources	DOI-USGS	Department of the Interior, U.S. Geological Survey
27	Approved	Cadastral	Protected Areas Database of the United States (PAD-US)	Data Resources	DOI-USGS	Department of the Interior, U.S. Geological Survey

Conservation and recreation measures

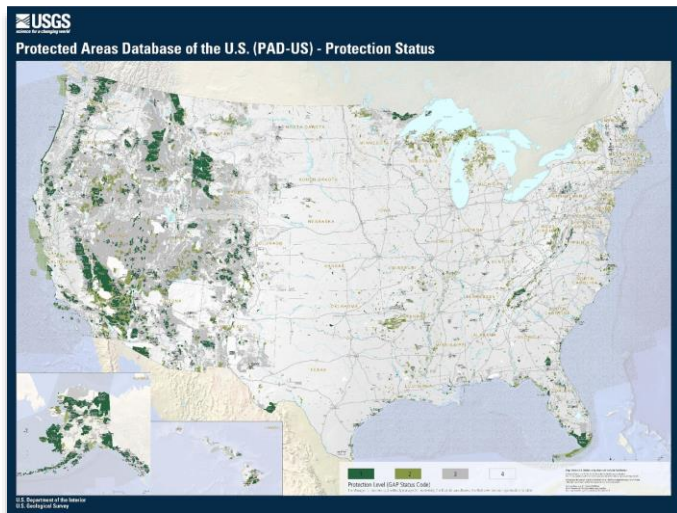


Current U.S. Status

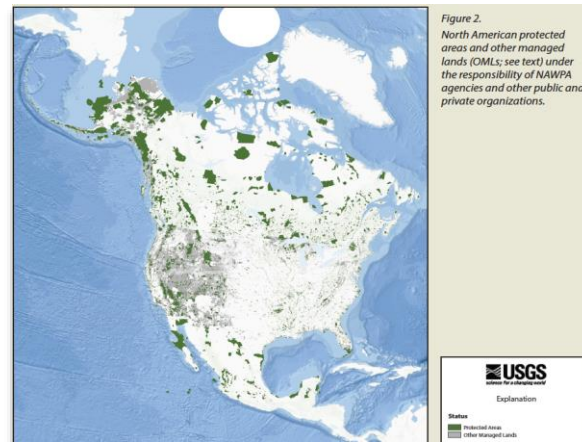
12% Protected Areas
18% Multiple Uses



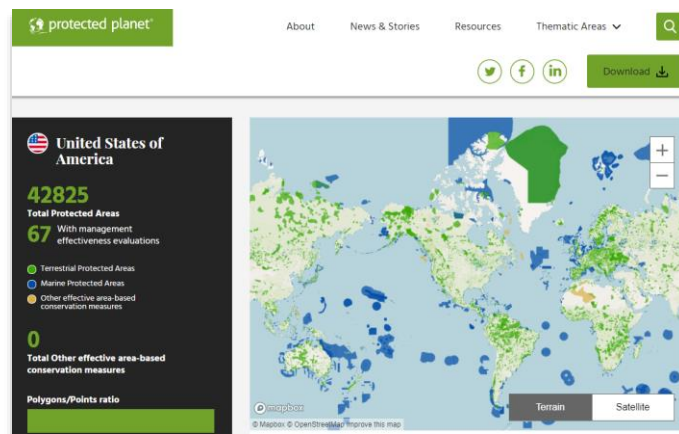
Local to global assessments



PAD-US



NAWPA North American PAD



UNEP-WCMC World Database on Protected Areas

How is PAD-US Built?

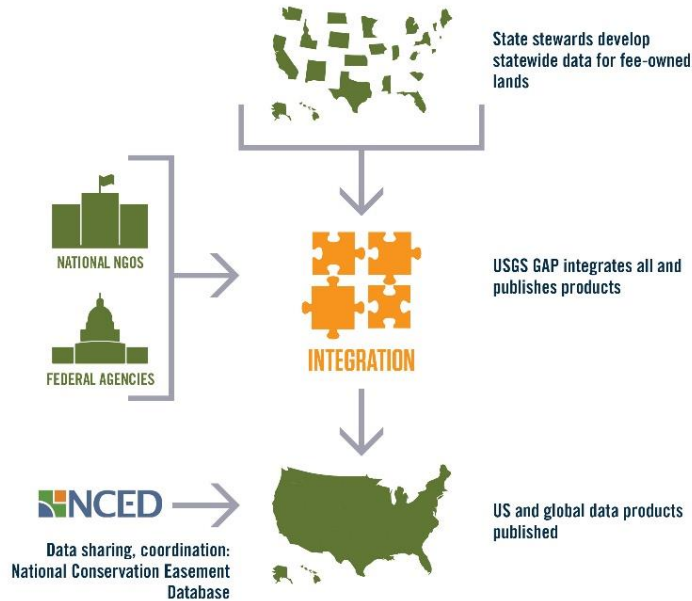
Collaboration builds PAD-US

States

Federal

Nonprofit

How PAD-US is Built



Federal Lands Workgroup

- 14 land managing and related agencies
- Collaboration** to aggregate federal land ownership and management designations into PAD-US
- Sharing** best practices, improving GIS systems, and automating updates to support applications

Integrating Federal Lands into PAD-US

Geospatial and reality professionals from land management (USFS, BLM, NPS, FWS, BOEM, BIA, USBR, NRCIS and DoD) and other federal agencies (USGS, Census, NWCG) are working to integrate land ownership and management boundaries to fulfill common agency needs.

Formed in October 2011, the FGDC Federal Lands Workgroup is a subgroup of the National Boundaries Group (NBSG), focused on the development and annual publication of a **cadstral geodatabase of aggregated federal lands**.

FY 2016-17 Goals:

- Automate the translation of authoritative source data into the PAD-US format
- Contribute to the next PAD-US update, published by USGS
- Assess and improve inventory completeness
- Assess and improve the compatibility of core attributes between agency datasets
- Identify and correct major boundary overlaps to produce a "flat" ownership file
- Share FLWG goals and accomplishments through outreach

Integrating Federal Lands into PAD-US

The Workgroup's procedures enable the compilation of protected lands data for all federal agencies into the Protected Areas Database of the United States (PAD-US), published by the USGS Gap Analysis Program.

FY 2016 Accomplishments

- Published aggregated federal lands ownership and management designations in PAD-US 1.4
- Developed a tool to harness reviewer comments regarding federal lands data
- Documented source data translation into PAD-US schema and needs to increase efficiency
- Significantly reduced boundary overlap errors between agency datasets, identified new priorities
- Improved "Agency Name" standard in cooperation with BLM and USGS Board of Geographic Names
- Maintain monthly calls and primary contacts from each federal land management agency

FGDC Federal Lands Workgroup

Chair: Doug Vandegrift, douglas.vandegrift@boem.gov

Co-Chair: Lisa Johnson, LisaJohnson@boisestate.edu

Members: Bob Pierce, rpierce@usgs.gov; Laura Waggoner, Laura.L.Waggoner@census.gov; Bob Adair, bader@blm.gov; Roger Johnson, Roger_M_Johnson@nps.gov; Ron Salz, ron_salz@fws.gov; Troy Warburton, twarburton@fs.fed.us; Barbara Simpson, bsimpson@usbr.gov; Madeline Sovich, madeline.sovich@census.gov; Ginny Dickerson, Virginia.L.Dickerson@erdc.dren.mil; Beth Wenstrom, beth.wenstrom@bia.gov; David LaBranche, david.labranche.civ@mail.mil; Steven Nechero, steven.nechero@fw.usda.gov; Andrew Bailey, Andrew_Bailey@nps.gov; Mimi D'Orto, mimi.dortio@noaa.gov

FGDC Federal Lands Workgroup Contacts

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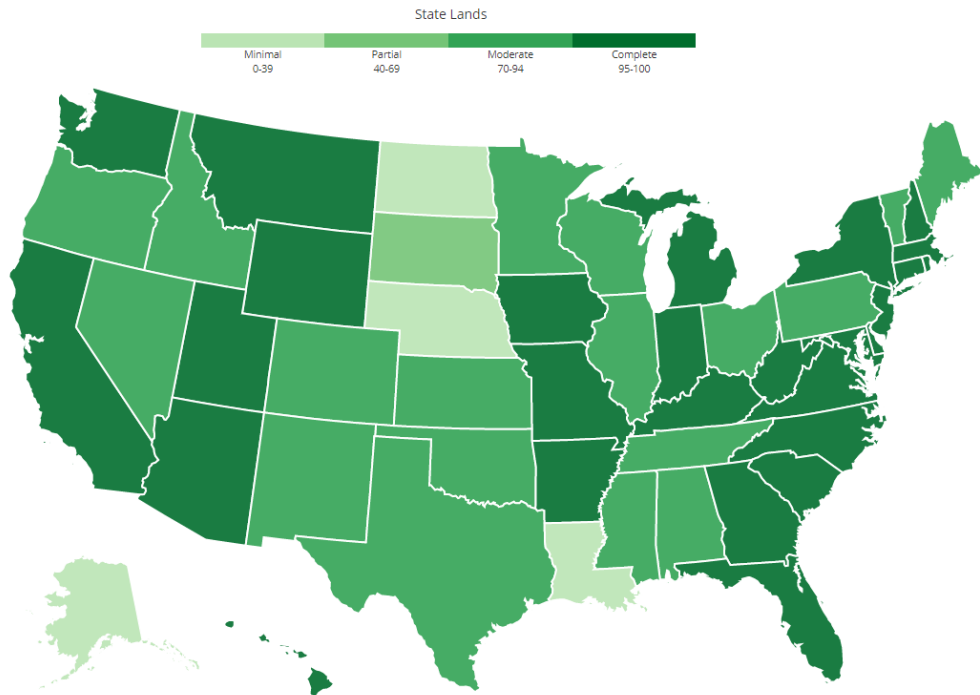
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State Stewards

- In **each** state: 1-2 agencies, universities, NGOs
- Compiles **nonfederal** lands data
- Many states with **effective** systems
- Other states need **improvement**
- **Learn more** about Data Stewards at: ProtectedLands.net

INVENTORY COMPLETENESS BY STATE



Nonprofit Partners

- Nonprofits **share data** with USGS and refine data standards
- **Help States** ‘catch up’ and improve inventories as needed
- TPL and DU manage NCED – sole source of **easements**



Foundational Data for 30x30

Contributions towards 30x30 Goals

Established partners, standards, and baseline data

PAD-US data partners

- *Federal, States, NGOs*

Opportunities

- Tribes
- Broader conservation stakeholder groups

PAD-US publishing & delivery

- *Last update Fall 2020 (annual Federal updates)*
- *Analytics for land management and protection status*



PAD-US Current Applications

Local to Global Applications - Biodiversity Protection Status, Climate, Connectivity, Park Access

- **Land Ownership and Management** - Definitive source for how much land is owned and managed (National Park Service)
- **Fire Risk Assessment** - Data from single source in support of wildland fire (National Wildfire Coordinating Group)
- **Conservation Planning** - States rely on PAD-US for planning Conservation Opportunity Areas (State Wildlife Action Plans)
- **Recreation & Healthy Communities** – CDC and NPS goals to get people outdoors more frequently (Centers for Disease Control, Department of the Interior)
- **Global Assessments** – Conservation analysis and data sharing globally (NAWPA*, World Conservation Monitoring Centre)

* North American Committee on Cooperation for Wilderness and Protected Areas Conservation



Conservation in North America:
An Analysis of Land-based Conservation in Canada, Mexico,
and the United States by NAWPA Agencies

The North American Intergovernmental Committee on Cooperation for Wilderness and Protected Area Conservation



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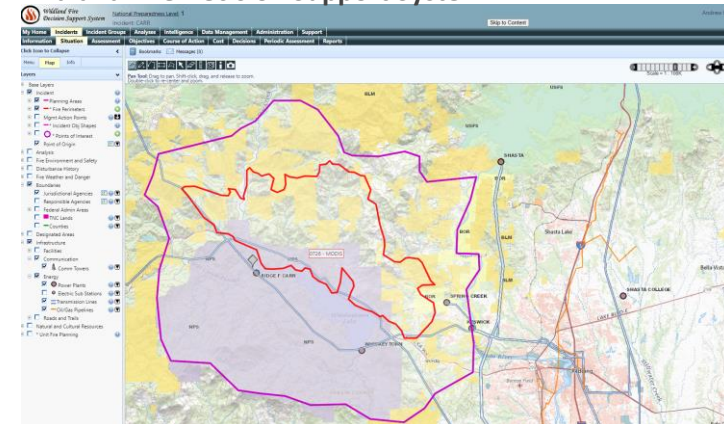
PAD-US in Action

Supporting National Wildfire Coordinating Group

Protected Areas Database of the United States (PAD-US) included in Wildland Fire Decision Support for:

- Decision-making related to wildland fires by providing ownership and management designation boundaries

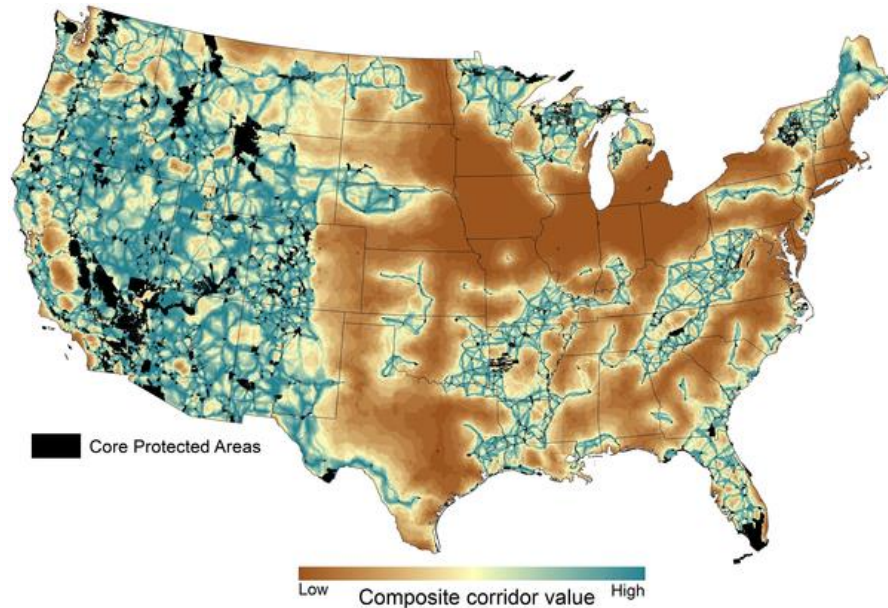
Wildland Fire Decision Support System



PAD-US in Action

Protected Land for Wildlife Corridors

- PAD-US data used to prioritize wildlife corridors for a connected network of protected lands.
- Protected areas form the core of a network with corridors to prevent isolation of ecosystems and populations.
- Study investigated which land units were most important for maintaining connectivity.



From Belote et al. 2016: Composite corridor value for providing connectivity between core protected areas.

Belote RT et al. (2016) Identifying Corridors among Large Protected Areas in the United States. PLoS ONE 11(4): e0154223. doi:10.1371/journal.pone.0154223

PAD-US in Action

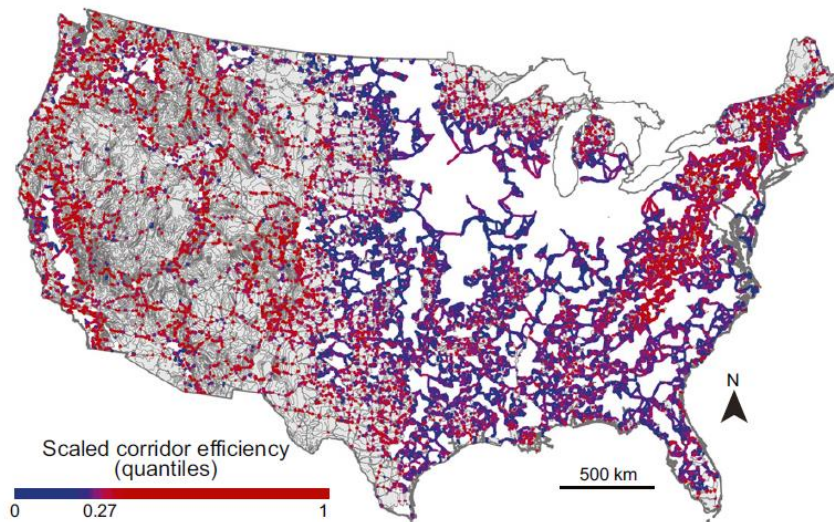
Habitat Connectivity with Shifting Climate

PAD-US protection status used to define “natural lands” which were then used to assess habitat connectivity in relation to climate change in landscapes.

Patterns of climate connectivity: “...spatial configuration of natural lands allows species to track their current climatic conditions during projected climate change.”

- McGuire et al. 2016

By examining these climate change-rated corridors in relation to protected lands, researchers and policy makers can better focus conservation resources to protected lands that fill in this corridor pattern.



From McGuire et al. 2016: Corridor efficiency. Patches are gray, and corridors are blue to red from highest to lowest relative efficiency for movement and conservation.

McGuire et al. 2016, Achieving climate connectivity in a fragmented landscape, *Proceedings of the National Academy of Sciences*, doi: 10.1073/pnas.1602817113

PAD-US in Action

Getting people outdoors, exploring parks for all communities

- PAD-US has historically contributed to recreation initiatives with multi-sector partners
- Serves as an integrated layer for federal, state, and NGO lands for human health initiatives, and local communities
 - CDC Health Impact Assessment Toolkit
 - 2020 Census for local references
 - RV Apps – US Public Lands

Parks and Trails

Health Impact Assessment Toolkit (1/12/14)
http://www.cdc.gov/healthimpacttools/parks_trails/

Introduction

Well-designed parks and trails are valued parts of our environment. Research examining the connection between parks, trails, and health has helped identify the value that parks provide to people. Parks and trails can promote physical activity and community engagement, and provide both environmental and mental health benefits. When well-designed, parks have been shown to reduce stress and foster community interaction. They can also protect sensitive lands such as flood plains and steep slopes.

Parks and trails can provide resources most communities need when addressing many of today's public health problems. And when questions arise about community policies or projects related to parks and trails—particularly, how to maximize their positive impact on public health—a health impact assessment (HIA) can provide answers.

What is a Health Impact Assessment?

A health impact assessment (HIA) is "a combination of procedures, methods, and tools by which a policy, program, or project may be judged as to its potential effects on the health of a population, and the distribution of those effects within the population."¹

An HIA evaluates objectively the potential health effects of a policy or project before it begins. An HIA can recommend measures to increase positive health outcomes and decrease adverse health outcomes. The HIA Framework can bring potential public health effects and considerations into the decision-making process for plans, projects, and policies that fall outside of traditional public health arenas, such as parks and trails. The U.S. Department of Health and Human Services recommends the HIA as a planning resource.

The major steps in conducting an HIA are:

- Screening—would an HIA be useful? If all the decisions have been made, an HIA probably is not appropriate. If HIA findings most likely would not change any decisions, an HIA would not be useful.
- Scoping—identify which health effects to consider and by what methods.
- Assessing risks and benefits—identify who might be affected and how they might be affected. Use data and research to determine the likelihood, direction, magnitude, and distribution of potential health effects.
- Developing recommendations—suggest changes to proposals to promote positive health effects or minimize adverse health effects.
- Reporting—present the results to decision makers and the public.
- Evaluating—determine whether the HIA will affect public health decisions and the actual effects of those decisions.



US Public Lands



What is US Public Lands?

The US Federal Governments owns nearly 650 million acres of land—almost 30 percent of the land area of the United States.

These are lands that are held for all Americans.

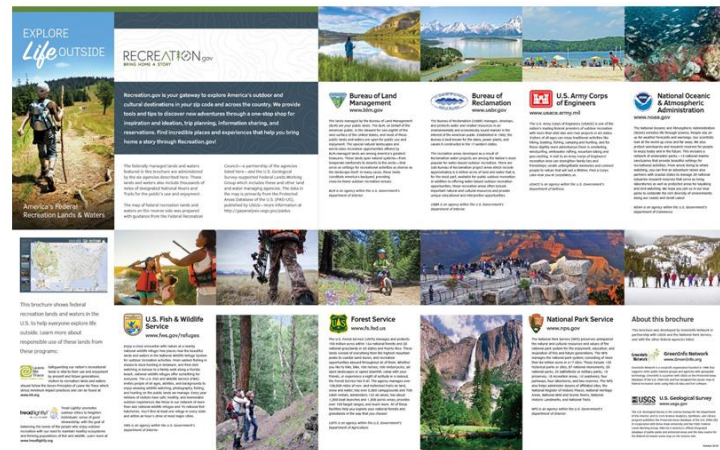
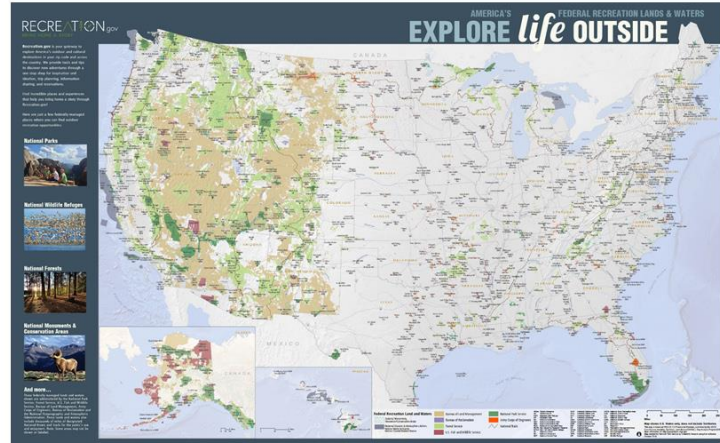
US Public Lands allows you to quickly retrieve the boundaries of these properties without carrying physical maps, books, or digging deep online.

Introducing... US Public Lands.



Included in the app are on-device (fully works offline), individually selectable & beautifully colored map layers for most of the properties administered by the federal government:

- Bureau of Land Management (BLM)
- US Forest Service (FS)



Data from PAD-US enabled the development of a new map highlighting federal recreation lands and waters in the U.S. The map highlights recreation lands managed by seven federal agencies.

PAD-US Contributions to 30x30 and Climate Science

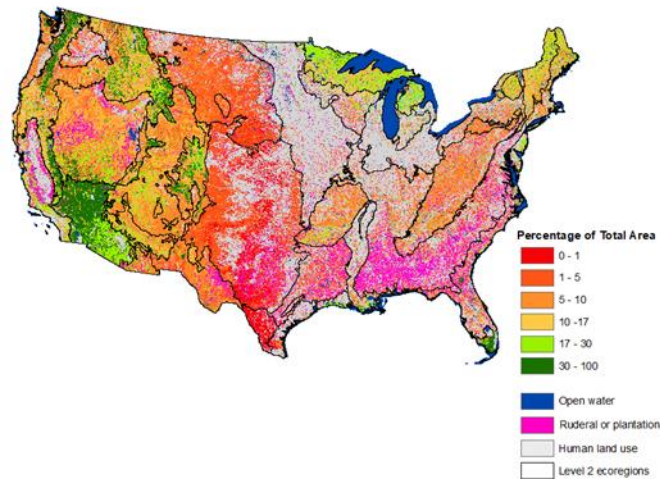
Biodiversity Protection Status, Climate Change Vulnerability and Mitigation, Connectivity, Park Access

PAD-US enables the priority conservation goal of 30% of U.S. lands and oceans by 2030 through assessing the benefits of protected areas *and the integration of additional data*

- *Local to global protection status* - land and water
- *Land cover/land use change* - habitat assessments, threats
- *Species decline* - status of rare species
- *Climate change vulnerability* – biodiversity assessments
- *Climate change mitigation* – corridors, fire, flood
- *Park equity* - equitable access to nature



Protected Areas and Habitat Analysis



Protection status designations of lands managed to maintain biodiversity (GAP Status 1&2) for the continental US. Percent area based on the area of each USNVC Group within each protection status divided by the total area of each of the natural USNVC Group across the conterminous U.S. Boundaries are EPA EcoRegion Level II. Areas in pink represent ruderal and plantation vegetation and gray areas are intensively managed or urbanized land uses. (McKerrow A. et al. In Press)

Data: PAD-US v2.1; National Gap Land Cover; LANDFIRE

PAD-US Summary

- Authoritative inventory of America's protected lands
- Long history of supporting conservation and land management needs
- Single integrated Federal, State, and NGO lands database
- Standards-based approached
- Contributes to baseline to track and monitor 30x30 performance
- Contributes to climate goals

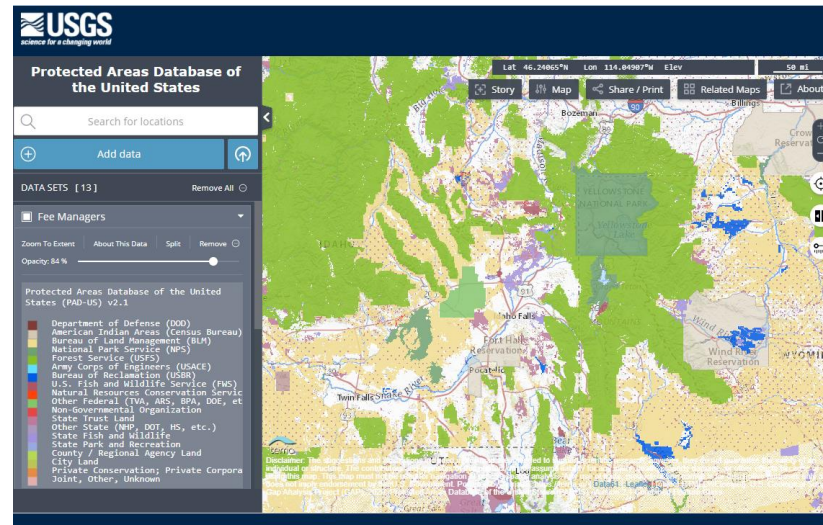


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Questions and Discussion

- Cheryl Morris, Program Coordinator, Science Synthesis, Analysis and Research (SSAR)
- Mike Frame, Associate Program Coordinator, SSAR
- Mark Wiltermuth, Biogeographic Science Branch Chief, SSAR



Explore PAD-US: maps.usgs.gov/padus

PAD-US Website: www.usgs.gov/gapanalysis/PAD-US

Announcements: pad-us@usgs.gov